OPTIONS FOR WATER QUALITY MONITORING
DRAFT - FOR DISCUSSION ONLY

Outlined below are three options for water quality monitoring: monitoring by individual dischargers, watershed group monitoring, and region-wide cooperative monitoring. Cost estimates are being developed for the proposed monitoring options. Several different approaches have been utilized, using bid estimates from several commercial laboratories, as well as from State contract laboratories. Budget estimates for the cooperative program were developed using several different scenarios, including use of a non-profit organization, use of a private consulting firm, and use of CCAMP monitoring staff. This latter approach was budgeted two ways; one where the entire program was implemented by CCAMP through fees, and another where a nonprofit organization would contract the field work and data management component to CCAMP staff. Budget estimates include staffing, instrumentation, data management, and other program requirements.

The cooperative approach is by far the most economical of the options described below. Because agricultural representatives have strongly expressed interest in a watershed group monitoring approach, costs were also developed for another option, where watershed groups would have at least one site on each of their watersheds supported through the cooperative program. This would reduce costs to them, and would maintain the data management and quality assurance advantages of the cooperative program. The program would provide direct data feedback to watershed groups to help support their management efforts. This scenario is somewhat more expensive than the original cooperative model, because additional sites will be needed to ensure adequate coverage in areas associated with watershed groups. Because the different monitoring approaches entail different levels of staffing support, fees required to support these various efforts vary.

Each monitoring approach has advantages and drawbacks, from both a grower and a Regional Board perspective. The Agricultural Advisory Panel will discuss the options at meetings during its next two scheduled meetings, and it is anticipated that the options may be modified based on recommendations of the Advisory Panel as well as input from the Board and the public.

Option 1: Individual Water Quality Monitoring

MONITORING REQUIREMENTS FOR INDIVIDUAL DISCHARGERS

Three classifications of individual discharger, based on the nature of the discharge, are shown below. Frequency of conventional and toxicity monitoring is established for each classification. Rainy season sampling for toxicity shall be conducted during or shortly after river runoff events, including the first event that results in significant flow increase. In the event that toxicity is detected in at least two samples, the discharger shall develop and implement a plan for elimination of the toxicity or, prior to development of such a plan, conduct an evaluation to identify the source of the toxicity.

1. Monitoring of operations with tailwater and/or tile drain discharge that enters surface waters and stormwater discharge (Table 1).

Table 1

Constituent	Units	Sample Type	Reporting Limit	Minimum Frequency of Sampling and Analysis

Nitrate as N	mg/L	Grab	0.1 mg/L	Monthly
Total ammonia	mg/L	"	0.1 mg/L	"
Orthophosphate as P	mg/L	"	0.01 mg/L	"
Total dissolved solids	mg/L	"	10 mg/L	"
Turbidity	NTUs	"	0.5 NTU	"
Flow	CFS			"
Toxicity *Ceriodaphnia dubia* (7-day chronic) *Pimephales promelas* *Selenastrum capricornutum*				Twice during wet season (Oct 15-March 15) and twice during dry season (May 15- Oct 15)

2. Monitoring of operations with tailwater that discharges to a holding pond for recycling and stormwater discharge (Table 2):

Table 2.

Constituent	**Units**	**Sample Type**	**Reporting Limit**	**Minimum Frequency of Sampling and Analysis**
Nitrate as N	mg/L	Grab	0.1 mg/L	Monthly in holding ponds
Nitrate as N	mg/L	Grab	0.1 mg/L	Twice in stormwater during wet season (Oct 15-March 15)
Total ammonia	mg/L	"	0.1 mg/L	"
Orthophosphate as P	mg/L	"	0.01 mg/L	"
Total dissolved solids	mg/L	"	10 mg/L	"
Turbidity	NTUs	"	0.5 NTU	"
Toxicity *Ceriodaphnia dubia* (7-day chronic) *Pimephales promelas* *Selenastrum capricornutum*				"

3. Monitoring of operations with stormwater only (no tailwater or tile drain discharge) (Table 3)

Table 3.

Constituent	**Units**	**Sample Type**	**Reporting Limit**	**Minimum Frequency of Sampling and Analysis**
Nitrate as N	mg/L	Grab	0.1 mg/L	Twice in stormwater during wet season (Oct 15-March 15)
Total ammonia	mg/L	"	0.1 mg/L	"
Orthophosphate as P	mg/L	"	0.01 mg/L	"
Total dissolved solids	mg/L	"	10 mg/L	"
Turbidity	NTUs	"	0.5 NTU	"

Toxicity *Ceriodaphnia dubia* (7-day chronic) *Pimephales promelas* *Selenastrum capricornutum*				"

QUALITY ASSURANCE PROJECT PLAN (QAPP)

Each discharger must have a quality assurance project plan that describes how data will be collected and analyzed to ensure that data is consistent with State and Regional Board monitoring programs and is of high quality. Dischargers shall develop a Quality Assurance Program Plan (QAPP), consistent with the State's Surface Water Ambient Monitoring Program (SWAMP) QAPP and approved by the Regional Board's Quality Assurance Officer. A draft QAPP template will be available through the Regional Board's website. All data collection shall be conducted utilizing field techniques consistent with SWAMP. All laboratory analysis shall be conducted by a laboratory certified by the Department of Health Services. The QAPP will include location of sample site(s), description of analytical techniques, data quality objectives, and other standard quality assurance information. All data will be submitted in electronic format to the Regional Board, in a format compatible with SWAMP.

Option 2: Group/Watershed Water Quality Monitoring

MONITORING REQUIREMENTS FOR WATERSHED GROUPS

The group shall conduct monitoring as shown in Table 4:

a. Water quality and flow monitoring shall be conducted monthly at all sites.

b. Water toxicity testing shall be performed twice during the rainy season (October 15-March 15) and twice during the dry season (May 15-October 15). Rainy season sampling shall be conducted during or shortly after river runoff events, including the first event that results in significant flow increase. In the event that toxicity is detected in at least two samples, the group shall develop a plan for elimination of the toxicity or, prior to development of such a plan, conduct an evaluation to identify the source of the toxicity.

c. Sediment toxicity shall be sampled once per year in spring. In the event that toxicity is detected in at least two samples, the group shall develop a plan for elimination of the toxicity or, prior to development of such a plan, conduct an evaluation to identify the source of the toxicity.

d. Rapid bioassessment for benthic invertebrate assemblages shall be conducted concurrently with spring sediment sampling.

Sites shall be located downstream of watershed group activities. In watersheds where tributaries are entering a main stem or where there are mixed land uses, additional sites may be necessary to distinguish agricultural discharges. The group may opt to place sites above group activities to characterize inputs to the watershed area.

Table 4

Constituent	Units	Sample Type	Reporting Limit	Minimum Frequency of Sampling and Analysis
Nitrate as N	mg/L	Grab	0.1 mg/L	Monthly
Total ammonia	mg/L	"	0.1 mg/L	"
Orthophosphate as P	mg/L	"	0.01 mg/L	"
Chlorophyll a	ug/L	"	1.0 ug/L	"
Dissolved oxygen	mg/L	"		"
Temperature	^{o}C	"		"
Total dissolved solids	mg/L	"	10 mg/L	"
pH	pH Units	"		
Turbidity	NTUs	"	0.5 NTU	"
Flow	CFS			"
Water toxicity *Ceriodaphnia dubia* (7-day chronic) *Pimephales promelas* *Selenastrum capricornutum*				Twice during wet season (Oct 15-March 15) and twice during dry season (May 15-Oct 15)
Sediment toxicity *Hyalella azteca* (10-day)		Composite		Spring (March 1 – April 30)
Benthic invertebrate assessment		California Rapid Bioassessment Protocol		Spring (March 1 – April 30), concurrent with sediment sampling

QUALITY ASSURANCE PROJECT PLAN (QAPP)

Each watershed group must have a quality assurance project plan that describes how data will be collected and analyzed to ensure that data is consistent with State and Regional Board monitoring programs and of high quality. The watershed group shall develop a Quality Assurance Program Plan (QAPP), consistent with the State's Surface Water Ambient Monitoring Program (SWAMP) QAPP and approved by the Regional Board's Quality Assurance Officer. A draft QAPP template will be available through the Regional Board's website. All sampling methodologies and data collection shall be conducted consistent with SWAMP and the Central Coast Ambient Monitoring Program (CCAMP). All data analysis shall be conducted by a laboratory certified by the Department of Health Services. All data will be submitted in electronic format to the Regional Board, in a format compatible with SWAMP.

The QAPP will include a watershed map showing monitoring sites, site-specific information, project organization and responsibilities, description of analytical techniques, data quality objectives, and other standard quality assurance information.

Option 3: Region-wide Cooperative Water Quality Monitoring

The focus of region-wide cooperative monitoring for the Conditional Waivers will be on beneficial use protection and waterbody health as opposed to individual effluent (discharge) monitoring. In order to accomplish this, the proposed cooperative monitoring program is

structured as a unified approach conducted by a single entity, rather than by each program participant. This approach will ensure that information used for decision-making is of the highest quality, will result in efficiency of data management, and will be cost-effective. Individual dischargers will be given the option of performing on-site monitoring or group/watershed monitoring, but Regional Board staff anticipate that participating in a cooperative program will be the most cost-effective approach. The cooperative program will be able to support watershed group monitoring needs, by ensuring that each participating watershed group has at least one site in its watershed area and by providing direct feedback on data results to group members.

MONITORING REQUIREMENTS FOR COOPERATIVE MONITORING

The core monitoring program will include monthly ongoing sampling of conventional water quality parameters at a set of core monitoring sites located in the major agricultural areas of the region. The initial list of waterbodies to be sampled is contained in Table 5. Additional water bodies may be added to this list in order to support watershed working groups that may opt to fulfill monitoring requirements through the cooperative program. Sampling at all core monitoring sites will include nitrate, total ammonia, orthophosphate, chlorophyll a, dissolved oxygen, temperature, total dissolved solids, turbidity, and flow (or at a minimum, stage data). Staff gages will be installed wherever possible to facilitate estimation of flow. Conventional water quality data will be evaluated on a regular basis to determine whether sites have problems, or if improvements are being detected.

Twice during the rainy season (October 15 – March 15) and twice during the dry season (May 15 – October 15) core monitoring sites will be sampled for water toxicity. Rainy season sampling will be conducted during or shortly after river runoff events, preferably including the first event that results in significant flow increase. Sediment toxicity will be sampled once per year, in spring. Rapid bioassessment for benthic invertebrate assemblages will be conducted concurrently with spring sediment sampling. All sampling methodologies will be consistent with the CCAMP monitoring approach.

Table 5. Waterbodies to be initially included in the core monitoring network

Hydrologic SubArea	WaterBody Name
30510	Harkins Slough
30510	Pajaro River
30510	Salsipuedes Creek
30510	Watsonville Slough
30530	Llagas Creek (below res.)
30530	San Benito River
30530	Tesquisquita Slough
30600	Moro Cojo Slough
30910	Blanco Drain
30910	Old Salinas River
30910	Salinas River (Lower)
30910	Tembladero Slough
30920	Alisal Creek
30920	Chualar Creek
30920	Gabilan Creek
30920	Quail Creek

30920	Salinas Reclamation Canal
30930	Salinas River (Mid)
31022	Chorro Creek
31023	Los Osos Creek
31023	Warden Creek
31024	Perfumo Creek
31024	San Luis Obispo Creek
31031	Arroyo Grande Creek
31031	Los Berros Creek
31210	Bradley Canyon Creek
31210	Main Street Canal
31210	Orcutt Solomon Creek
31210	Oso Flaco Creek
31210	Santa Maria River
31410	Santa Ynez River (below res.)
31531	Bell Creek
31531	Glenn Annie Creek
31534	Arroyo Paredon
31534	Franklin Creek

The following monitoring will be conducted at all core monitoring sites (Table 6):

a. Water quality and flow monitoring shall be conducted monthly at all sites.

b. Water toxicity testing shall be performed twice during the rainy season (October 15-March 15) and twice during the dry season (May 15-October 15). Rainy season sampling shall be conducted during or shortly after river runoff events, including the first event that results in significant flow increase.

c. Sediment toxicity shall be sampled once per year, in spring.

d. Rapid bioassessment for benthic invertebrate assemblages shall be conducted concurrently with spring sediment sampling.

Table 6.

Constituent	**Units**	**Sample Type**	**Reporting Limit**	**Minimum Frequency of Sampling and Analysis**
Nitrate as N	mg/L	Grab	0.1 mg/L	Monthly
Total ammonia	mg/L	"	0.1 mg/L	"
Orthophosphate as P	mg/L	"	0.01 mg/L	"
Chlorophyll a	ug/L	"	1.0 ug/L	"
Dissolved oxygen	mg/L	"		"
Temperature	^{o}C	"		"
Total dissolved solids	mg/L	"	10 mg/L	"
pH	pH Units	"		
Turbidity	NTUs	"	0.5 NTU	"
Flow	CFS			"

Water toxicity *Ceriodaphnia dubia* (7-day chronic) *Pimephales promelas* *Selenastrum capricornutum*				Twice during wet season (Oct 15-March 15) and twice during dry season (May 15-Oct 15)
Sediment toxicity *Hyalella azteca* (10-day)		Composite		Spring (March 1 – April 30)
Benthic invertebrate assessment		California Rapid Bioassessment Protocol		Spring (March 1 – April 30), concurrent with sediment sampling

QUALITY ASSURANCE PROJECT PLAN (QAPP)

The cooperative program must be conducted according to an approved quality assurance project plan (QAPP) that describes how data will be collected and analyzed to ensure that it is consistent with State and Regional Board monitoring programs and of high quality. The program manager shall develop a QAPP that is consistent with the State's Surface Water Ambient Monitoring Program (SWAMP) QAPP and approved by the Regional Board's Quality Assurance Officer. A draft QAPP template will be available through the Regional Board's website. All sampling methodologies and data collection shall be conducted consistent with SWAMP and the Central Coast Ambient Monitoring Program (CCAMP). All data analysis shall be conducted by a laboratory certified by the Department of Health Services. All data will be submitted in electronic format to the Regional Board, in a format compatible with SWAMP.

The QAPP will include a map of monitoring sites, site-specific information, project organization and responsibilities, description of analytical techniques, data quality objectives, and other standard quality assurance information.

ADDITIONAL MONITORING IN PROBLEM AREAS

Follow-up monitoring in problem areas should be conducted in a way to improve understanding of the nature and source of the problem, and needn't be ongoing in nature. The intent of follow-up monitoring during the first cycle of the waiver program is to increase understanding of the type of chemical, areal scope, or severity of the problem such that better feedback can be provided to growers related to management practice implementation. Specific questions of concern and study designs to answer these questions will be developed for any follow-up monitoring. Because forensic chemistry and other analytic approaches can rapidly increase program costs, problem areas will be prioritized relative to severity of problem, availability of other data sources to inform decision-making, and other considerations. The total budget will make provision for a core network of 60 sites, an additional 15% for follow-up investigative monitoring in problem areas, and the necessary staff and administrative costs to maintain the program. In certain severe cases of water quality pollution, the Regional Board may seek to require additional monitoring by individual dischargers.

FUNDING MECHANISM FOR COOPERATIVE MONITORING

Funds for the cooperative monitoring program will be collected and managed by an entity (nonprofit organization or other suitable group) designated by an Agricultural Advisory Group and acceptable to the Regional Board. This group may conduct the monitoring as specified by the approved Quality Assurance Program Plan, or may contract out the monitoring to qualified consultants. This group may also elect to work with Regional Board staff to have some or all of the monitoring conducted through CCAMP. In this latter approach, the nonprofit would hire sampling staff and pay laboratory costs, but the sampling effort, data management and quality

assurance would be conducted under the supervision of CCAMP staff. This approach could potentially reduce overall costs, because it would make use of electronic data uptake, quality assurance, and management tools already developed for the CCAMP program.

Dischargers wishing to participate in the cooperative monitoring program will elect this monitoring option during the enrollment process and will pay annual dues to a nonprofit foundation or other entity certified by the Regional Board to conduct such monitoring. The total budget will make provision for a core network of 60 sites, an additional 15% for follow-up investigative monitoring in problem areas, and the necessary staff and administrative costs to maintain the program. Although the nonprofit foundation will set the individual grower costs in consideration of administrative, staffing and laboratory costs, the Regional Board recommends a cost structure similar to that set forth below in Table 8. These estimates were developed assuming 2500 enrollees, using data from the Agricultural Census to estimate acreage breakdown, and cost information from several private and university laboratories to estimate analytical costs.

Table 8. Estimated Costs for Participating in the Cooperative Monitoring Program

Acreage	Tail Water to Surface Water/Tile Drain/ Stormwater	Tail Water to Pond/Stormwater	Stormwater Only
Less than 50	$400	$100	$50
50 - 99	$500	$200	$100
100-199	$600	$300	$150
200-299	$700	$400	$200
300-399	$800	$500	$250
400-499	$900	$600	$300
500-599	$1000	$700	$350
600-999	$1500	$800	$400
1000-2000	$2000	$1000	$500
2000 and greater	$2500	$1200	$600

It is anticipated that the program will not immediately collect sufficient fees to implement the monitoring effort in full. In this case, the program will begin implementation using a reduced site count. Sites will be prioritized based on severity of past problems as indicated by CCAMP data. As funding grows, site count will be increased until the full program can be implemented.